

REMARKS

The Examiner's continued attention to the present application is noted with appreciation.

The Examiner rejected claims 1-20 under 35 U.S.C. § 112, first paragraph, as not enabled. The rejection is traversed. The Examiner is directed to MPEP § 2164.08, which states that: "The determination of the propriety of a rejection based upon the scope of a claim relative to the scope of the enablement involves two stages of inquiry. The first is to determine how broad the claim is with respect to the disclosure. The entire claim must be considered. The second inquiry is to determine if one skilled in the art is enabled to make and use the entire scope of the claimed invention without undue experimentation."

As to step 1, note that the claims at issue are directed to an apparatus and method employing the combination of a tachometer, compensation electronics receiving input from the tachometer and a motor, and drive electronics providing output to the motor. As to step 2, note that Fig. 5 discloses a complete circuit diagram for an embodiment of the invention damping an approximate 400 Hz belt mode in conjunction with a DC torque motor and a limited angle tachometer. This is a circuit diagram, not a block Matrix/Matlab diagram, for the complete compensation and drive electronics and shows the necessary connections to the tachometer and the drive motor. It is therefore ridiculous to assert that any significant experimentation, let alone undue experimentation, is required to make an embodiment of the invention. Note that Hughes '254 did not provide an actual circuit diagram.

The Matrix/Matlab diagrams (Figs. 1-4) provide more general information about the embodiment of the invention illustrated. A primary patentable aspect of the present invention is shown by the contrast between Fig. 3 of the present application and Fig. 7 of Hughes '254, which show the filter of the prior art and new active damper, respectively, that precedes the damper current loop. While each particular implementation of an active damper will be different depending on the nature of the mirror being

dampened and its expected environments, Fig. 3 shows to one of ordinary skill in the art the manner in which the tachometer is employed and the concomitant elimination of previously needed low pass filters.

One of ordinary skill in the art would not need to engage in undue experimentation to reproduce the present invention from the present application.

The Examiner rejected claims 1 and 11 under 35 U.S.C. § 102(e) as being anticipated by Predina. The rejection is traversed in view of the attached Rule 131 declaration by Applicant, this time with the missing Exhibit A. The courtesy of a telephone call regarding the missing Exhibit would have been appreciated.

The Examiner rejected claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over Hughes '254 in view of Harris et al. ("Harris"). The rejection is traversed.

Hughes '254 is certainly pertinent, but Harris has nothing to do with the technology at issue. Harris discloses the use of a tachometer in aiding acceleration/deceleration of a magnetic tape. Harris contains no teaching or suggestion (nor does Hughes '254) that a tachometer would be useful in the problem of eliminating drive modes in an optical system. Absent such teaching or suggestion, the Examiner is engaging merely in impermissible hindsight concerning the patentability of the invention.

Furthermore, Hughes '254 teaches away from the present invention. As discussed in Hughes '254 at col. 3, lines 13-51, one or more accelerometers measuring mirror acceleration are employed to counteract the effects of vibra-acoustic noise and belt mode resonant amplification, with a concomitant great degree of complexity. The present invention rather employs a tachometer measuring speed (not acceleration) of a drive motor. The combination of Hughes '254 with Harris results in a complex system with both accelerometers and a tachometer. There is no suggestion in Hughes '254 that reducing complexity and eliminating acceleration measurement could result in an effective active damping system.

An earnest attempt has been made to respond to each and every ground of rejection advanced by the Examiner. However, should the Examiner have any queries, suggestions or comments relating to a speedy disposition of the application, the Examiner is invited to call the undersigned.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,

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LOCKHEED MARTIN

Disclosure No. EM-01818

## DISCLOSURE OF NEW TECHNOLOGY

DESCRIPTIVE TITLE: Active Belt Mode Damper



### 1. ORIGINATOR(S)/INVENTOR(S)

|                               |                |                   |      |
|-------------------------------|----------------|-------------------|------|
| NAME<br>John G. Hughes        |                | NAME              |      |
| ADDRESS<br>1472 Southwind Dr. |                | ADDRESS           |      |
| CITY<br>Casselberry, FL       | ZIP<br>32707   | PHONE<br>356-6945 | CITY |
| SS#                           | EMP.#<br>58445 | MP#<br>205        | SS#  |
|                               |                |                   | EMP# |
|                               |                |                   | MP#  |

### 2.a. ABSTRACT OF IDEA/INVENTION (Succinctly describe in approximately 40 to 50 words the precise idea or invention.)

An active damper consisting of a motor, tachometer, compensation electronics and drive electronics provides damping of the belt drive mode in stabilized gimbals.

### 2.b. OBJECTS (Indicate particular application, prior problems, and needs giving rise to idea)

Will be used on the stabilized mirrors for Tracer and Comanche.

### 3. DETAILED DESCRIPTION (Explain how idea works, basic design and materials used. Attach additional pages of description as well as sketches or photos.)

The active damper consists of a motor, tachometer, compensation electronics and drive electronics. It provides damping of the very high Q belt mode, virtually eliminating it. It is insensitive to variations in the mode that are induced thermally and by manufacturing tolerances. Further, it does not impact desirable low frequency operation of the gimbal.

### 4. ADVANTAGES OVER PRIOR PRACTICES (Indicate differences and advantages over prior art, unpredicted results and any new benefits.)

Notch filters must be tuned to the structural mode. Slight mismatches can cause control loop instability. Passive techniques suffer from thermal sensitivity and do not provide the level of damping that can be achieved with the active damper.

5. EARLIEST DATE OF CONCEPTION: \_\_\_\_\_ WHERE CONCEIVED: LM E&M

### 6. IN CONNECTION WITH WORK ON THIS INVENTION, WAS ANY TIME AND/OR MATERIAL CHARGED:

(a) To a Government No If so, how identified? \_\_\_\_\_

(b) To a Government contract? No If so, what Contract No.? \_\_\_\_\_

(c) To Company overhead? No If so, what account number? \_\_\_\_\_

(d) In anticipation that the idea would be included as part of a proposal to the government?  
How identified? \_\_\_\_\_ How charged? \_\_\_\_\_

| 8. FIRST PERSONS TO WHOM DISCLOSED | ADDRESS | METHOD OF DISCLOSURE<br>Use number(s)* | DATE |
|------------------------------------|---------|----------------------------------------|------|
| a. Dave Sherard                    |         | 2                                      |      |
| b.                                 |         |                                        |      |

\* (1) Making rough sketches, etc., explaining sketches  
 (2) Describing construction and operations orally  
 (3) Showing written description  
 (4) Demonstrating a model  
 (5) Other evidence of conception, explain

| 9. INVENTION DATA           | DATE | WHERE FILED | WITNESSES TO SAME     | TITLE, NUMBER OR OTHER ID. |
|-----------------------------|------|-------------|-----------------------|----------------------------|
| (a) 1st Drawing:            |      |             | Name:<br><br>Address: |                            |
| (b) 1st Written Description |      |             | Name:<br><br>Address: |                            |

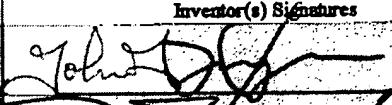
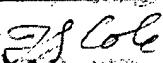
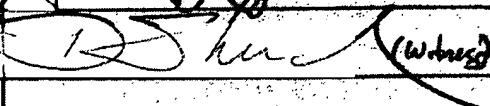
10. REPORTS AND NUMBER AND PAGES OF LOG OR NOTEBOOKS BEARING ON THIS INVENTION:

| 11. DEVELOPMENT OF INVENTION                       | DATE | PLACE | WORK PERFORMED BY | WITNESS AND ADDRESS   |
|----------------------------------------------------|------|-------|-------------------|-----------------------|
| (a) Start of work on method, prototype or product. |      |       |                   | Name:<br><br>Address: |
| (b) Completion of work.                            |      |       |                   | Name:<br><br>Address: |
| (c) First test.                                    |      |       |                   | Name:<br><br>Address: |

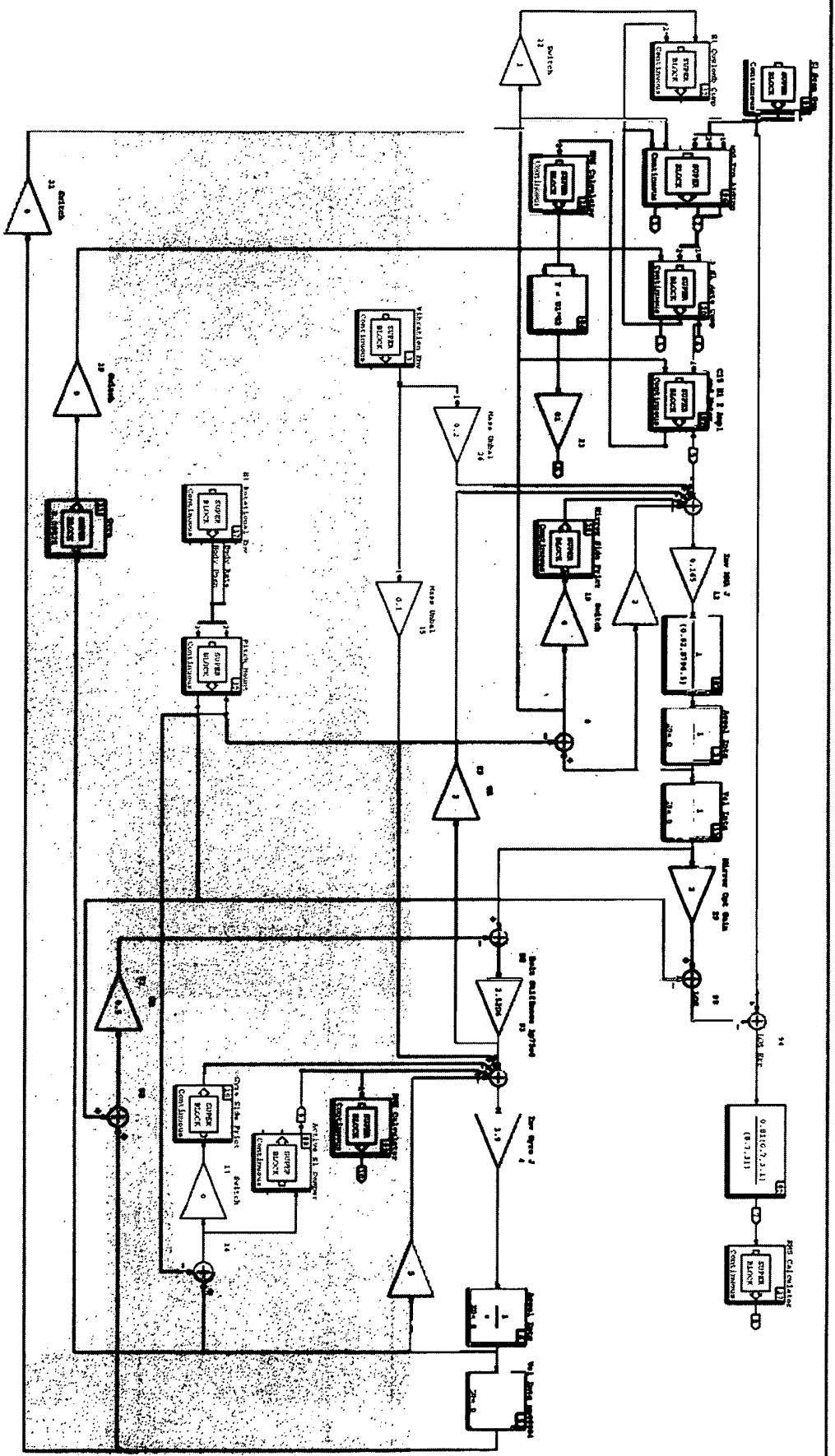
12. OTHER DISCLOSURES: Oral or written disclosures to witness(es) not mentioned previously, especially to those outside the company.

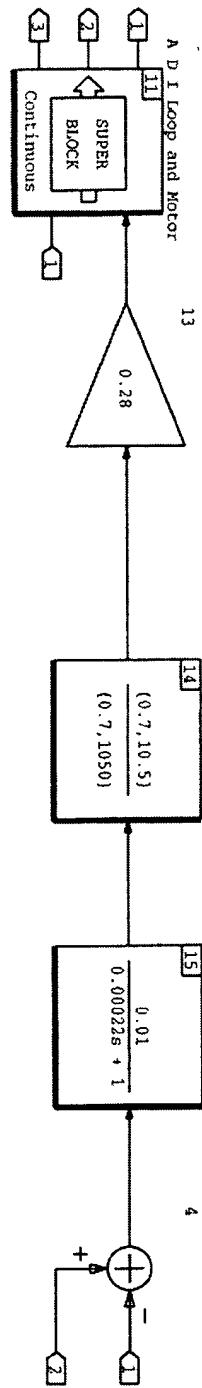
13. ITEMIZATION OF DOCUMENTS BEING ATTACHED TO THIS DISCLOSURE:

14. INVENTOR(S) AND 2 OR 3 WITNESSES SHOULD SIGN BELOW IN SPACES INDICATED:

| Dates<br>Month<br>Day | Year | Inventor(s) Signatures                                                              | Witnesses Signature:<br>Read and Understood by                                       | Dates<br>Month<br>Day | Year |
|-----------------------|------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------|------|
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|                       |      |  |                                                                                      |                       |      |
|                       |      |                                                                                     |                                                                                      |                       |      |
|                       |      |                                                                                     |                                                                                      |                       |      |

Continuous SuperBlock      Inputs      Outputs  
C15 E1 Servo      0      10





| Continuous SuperBlock | Inputs | Outputs |
|-----------------------|--------|---------|
| Active El Damper      | 2      | 3       |